

Application No.: 10/540,606  
Amendment Dated June 3, 2009  
Reply to Final Office Action of April 3, 2009

MAT-8716US

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Appln. No: 10/540,606  
Applicants: Toshiaki Takenaka et al.  
Filed: June 27, 2005  
Title: METHOD AND APPARATUS FOR  
MANUFACTURING CIRCUIT BOARD  
T.C./A.U.: 1792  
Examiner: Brian K. Talbot  
Confirmation No.: 9266  
Docket No.: MAT-8716US

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**AMENDMENT UNDER 37 C.F.R. § 1.116**

**Expedited Procedure**

MAIL STOP AF  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Responsive to the Final Office Action dated April 3, 2009, please amend the above-identified application as follows:

- ☐ **Amendments to the Specification** begin on page                      of this paper.
- ☐ **Amendments to the Claims** are reflected in the listing of claims which begins on page                      of this paper.
- ☐ **Amendments to the Drawings** begin on page                      of this paper and include an attached replacement sheet(s).
- ☐ **Amendments to the Abstract** are on page                      of this paper. A clean version of the Abstract is on page                      of this paper.
- ☒ **Remarks/Arguments** begin on page **2** of this paper.

**Remarks/Arguments:**

Applicants acknowledge with thanks the courtesy extended to their representative by Examiner Talbot during a telephone interview. During the course of the interview, the rejections under 35 U.S.C. § 112 and 35 U.S.C. § 103 were discussed. Applicants will now provide a written version of the arguments which were presented to the Examiner during the telephone interview.

Various claims have been rejected under 35 U.S.C. § 112, first paragraph. In particular, the Official Action stated that language relating to 3µm was "critical or essential to the practice of the invention." On page 11, lines 24-26, however, it is stated:

A height of swollen portion 7 is preferably set not lower than 3µm. If it is lower than 3µm, an effect of removing paste bonded to an edge of a squeegee deteriorates.

Thus, Applicants' specification uses the words "preferably" and "deteriorates." 3µm is not indicated in Applicants' specification as being critical or essential. 3µm is a preferable limit. Withdrawal of the rejection is respectfully requested.

Claims 1-5, 7-16, 23, 24 and 26-35 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Takenaka (JP 2001-213,064) in combination with Kuroki (JP 57-103862). The rejection is respectfully traversed.

Applicants' claim 1 recites the feature of:

... forming a plurality of depressions ... each depression defining a perimeter portion, each perimeter portion having an elevation higher than an elevation of the first surface ...

This feature is illustrated, for example, by Applicants' Fig. 3. Depression 6 is shown. Perimeter portion 7 is also shown. As can be seen from the figure, perimeter portion 7 has an elevation higher than an elevation of the surface of mask film 2a.

The Office Action argues that it would have been obvious to have modified Takenaka to include "elevations" along with depressions as evidenced by Kuroki. Kuroki's "elevations," however, are not situated along perimeter portions of depressions - in contrast with Applicants'

claim language. Kuroki's elevations are situated in one group and Kuroki's depressions are situated in another group.

It is because Applicants include elevated perimeters defined by each depression that a squeegee is able to spread conductive paste in a desirable manner. As Applicants' claimed elevated perimeters of each depression are neither disclosed nor suggested by the art of record, Applicants' claim 1 is patentable over the art of record.

The remaining claims are patentable by virtue of their dependency on allowable claim 1.

During the course of the interview, Applicants submitted a partial translation of the Kuroki reference in order to show Kuroki's lack of disclosure of Applicants' claimed elevated perimeters. That partial translation is now being formally filed.

In view of the arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,



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Enclosure: Partial Translation of Kuroki

Dated: June 3, 2009

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Page 4, line 11 to page 5, line 20:

Fig. 5(A) shows a concave pattern formed on stainless-steel 9 of 0.05-0.1 mm thickness by photo-etching method according to either both printing pattern 5 and concave pattern 8 being formed simultaneously or after forming of printing pattern 5 concave pattern being formed by additional photo-etching.

In this case, Ferric chloride is used for etching solution. Baumé degree of the Ferric chloride is 40°Bé, and the liquid temperature is 40° C. A depth of the etching is 20-50  $\mu\text{m}$ .

Fig. 5(B) shows convex pattern 8' formed by Nickel-plating method after forming of printing pattern 5 and forming of a resist to plating with photo-resist. A stainless-steel 9 is used as used in Fig. 5(A).

Two plating solutions are used to form two plating layers, and conditions for Nickel plating are as follows;

The first plating conditions;	NiCl <sub>2</sub> ·6H <sub>2</sub> O .....240g/l, HCl (35%).....80g/l
	Liquid temperature.....room temperature
	Current density.....2A/dm <sup>2</sup>
	Plating time.....5 minutes
The second plating conditions;	Watts bath, Sulfamic acid bath
	Liquid temperature.....30-50° C
	Current density.....3A/dm <sup>2</sup>
	Plating time.....30 minutes

Even when copper or an alloy thereof is used as a material of the screen and nickel plating or etching method is employed, the convex or concave pattern can be formed.

The screen plate (Mask) is provided with either convex or concave pattern. With using the screen plate for filling conductive paste into through-hole, it is possible to prevent the paste from slipping, and simultaneously the paste can hold fluidity. Accordingly the filling performance is good.